

**Appl. No.** : 10/661,007  
**Filed** : September 11, 2003

### **REMARKS**

In response to the Office Action mailed September 15, 2004, Applicant has amended the application as above. No new matter is added by the amendments as discussed below. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the amendments and the remarks set forth below.

#### **Discussion of Claim Amendments**

Claims 1, 5-7, 11, and 17 have been amended. Upon the entry of the amendments, Claims 1-17 are pending in this application. The amendments to Claims 1, 11 and 17 are supported, for example, by paragraph [0045] and Figures 5-7. The amendments to Claims 5-7 are merely made for clarification (see, for example, paragraph [0046]) and do not narrow the scope of protection. Furthermore, no new matter is added by the amendments. Applicant respectfully requests the entry of the amendments.

#### **Discussion of Priority Under 35 U.S.C. § 119(a)-(d)**

The Examiner indicated that none of certified copies of priority documents have been received. Applicant will shortly file certified copies of the Korean applications.

#### **Discussion of Priority Under 35 U.S.C. § 120**

Applicant has noticed that the Office Action does not acknowledge a domestic priority claim under 35 U.S.C. § 120. However, Applicant made a domestic priority claim in the specification and the transmittal as filed on September 11, 2003. Thus, Applicant respectfully requests that the next Office Action acknowledge the domestic priority claim.

#### **Response to Examiner's Comments**

Applicant wishes to respond to the comments on the claims made on pages 3-4 of the Action. Each claim is distinguished from the prior art in view of the entirety of its verbiage and not any particular language as, for example, has been noted by the Examiner.

#### **Discussion of Claim Rejections Under 35 U.S.C. § 103(a)**

The Examiner has rejected Claims 1-5, 8, 11, and 17 under 35 U.S.C. § 103 (a) as being unpatentable over DiMatteo, et al. (U.S. Patent No. 4,269,513; hereinafter “‘513 DiMatteo”).

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The Examiner has also rejected Claims 9 and 10 under 35 U.S.C. § 103 (a) as being unpatentable over ‘513 DiMatteo in view of DiMatteo, et al. (U.S. Patent No. 4,1879,011; hereinafter “‘011 DiMatteo”). Applicant respectfully traverses the Examiner’s claim rejections as discussed below.

#### Standard of Prima facie Obviousness

In order to provide a *prima facie* showing of obviousness under 35 U.S.C. § 103, all the claim limitations must be taught or suggested by the prior art. *See, e.g., In re Royka*, 490 F. 2d 981, 180 U.S.P.Q. 580 (CCPA 1974); MPEP 2143.03.

#### Discussion of Patentability of Independent Claims 1, 11 and 17

Independent Claim 1, as amended, recites, among other things, a photographing section configured to photograph the object with *at least two of the plurality of striped patterns being simultaneously projected* thereon. Claim 1 further recites “an operational unit configured to estimate images of the object from the photographed image.” Each of independent Claims 11 and 17 comprises similar claim terms. Applicant respectfully submits that “the ‘513 DiMatteo reference neither teaches nor suggests the above-indicated features of the claimed invention.

#### **1. ‘513 DiMatteo Neither Teaches nor Suggests “a photographing section configured to photograph the object with at least two of the plurality of striped patterns being simultaneously projected thereon”**

‘513 DiMatteo neither teaches nor suggests “a photographing section configured to photograph the object with *at least two of the plurality of striped patterns being simultaneously projected* thereon.” More particularly, ‘513 DiMatteo teaches that:

Each illuminating pattern as represented by FIGS. 2a, 2b, and 2c, for example, is photographed by cameras 40 which have the entire surface 22 within their field of view. Whereas only three patterns are represented in the drawing to correspond to three separate binary terms, in practice the cameras 40 photograph each pattern separately for as many binary terms as are necessary to obtain the quantity N. For each photograph taken by the cameras 40, moreover, the projectors 26, 28, 30, 32 project onto the object, a single pattern of a single mask. *See column 4, lines 4-14 of DiMatteo and Figures 2-3.*

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In view of the above, in '513 DiMatteo, only a single mask (36; pattern) is separately projected on the object (20). The camera (40) photographs the object (20), on which a single pattern is separately projected, independently several times as shown in Figures 2 and 3. In contrast, amended Claim 1 (and Claims 11 and 17 in a similar term) recites, a photographing section configured to photograph the object with *at least two of the plurality of striped patterns being simultaneously projected* thereon. There is no teaching or suggestion in '513 DiMatteo that the camera (40) can image the object (20) on which more than two striped patterns (masks) are simultaneously projected. *See Figures 2 and 3.*

In view of the above, Applicant respectfully submits that '513 DiMatteo neither teaches nor suggests "a photographing section configured to photograph the object with at least two of the plurality of striped patterns being simultaneously projected thereon" recited in amended Claim 1. Furthermore, '513 DiMatteo neither teaches nor suggests "photographing the object, on which *at least two of the plurality of striped patterns have been simultaneously projected*" recited in each of Claims 11 and 17, as amended.

**2. '513 DiMatteo Neither Teaches nor Suggests "an operational unit configured to estimate images of the object from the photographed image"**

'513 DiMatteo neither teaches nor suggests "an operational unit configured to estimate images of the object from the photographed image." '513 DiMatteo teaches that:

The photographs 44 are scanned in sequence by means of a photoelectric cell or electron beam scanner 46 or other conventional scanning device, for example, and the scanned information is inserted into a computer 48, as shown in FIG. 6. A point P, for example, on the surface 22 will also appear in the photographs 44 taken by the cameras 40. Depending upon the particular photograph taken in the sequence of patterns as shown in FIG. 2, for example, the point P will appear within different shaded and non-shaded bands. If a shaded band is assigned the digit "1" and a non-shaded band is assigned the digit "0", then referring to FIG. 2, it is seen that in FIG. 2a the point P lies within a shaded band, so that a "1" may be assigned to FIG. 2a. Similarly, since the point P lies within a non-shaded band in FIG. 2b and within a shaded band once again in FIG. 2c, the digits "0" and "1" may be assigned, respectively, to FIGS. 2b and 2c in relation to point P. See column 4, lines 40-57 of DiMatteo

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The scanner (56) and the computer (48), arguably corresponding to the claimed operational unit, separately process each captured image, including a single pattern separately projected, by assigning digital value “1” or “0” depending on the location of the point “P” on the photographed image. That is, the scanner (56) and the computer (48) do not estimate images of the object from the photographed image as in the claimed invention. Furthermore, since in ‘513 DiMatteo the cameras (40) photograph each pattern separately, the ‘513 DiMatteo reference cannot estimate images of the object from the photographed image (including at least two striped patterns being simultaneously projected). Applicant respectfully submits that ‘513 DiMatteo does not teach “an operational unit configured to estimate images of the object from the photographed image” recited in Claim 1. Furthermore, ‘513 DiMatteo does not teach “estimating images of the object, which would be obtained by projecting a plurality of single striped patterns onto the object, from the photographed image” recited in each of Claims 11 and 17.

### **3. Summary**

In view of the above, ‘513 DiMatteo neither teaches nor suggests the above-recited claim terms. According to one embodiment of the invention, since at least two striped patterns are simultaneously projected onto an object, the length of the pattern film can be shorter than that of the prior art such as ‘513 DiMatteo. This means that the pattern film can be transported more precisely than a pattern film formed with a plurality of single striped patterns as in the prior art, and thus a precise measurement result can be obtained. For instance, if the forward proceeding precision is kept in ‘20 $\mu$ m’ in the transportation of the pattern film, the proceeding precision can be more easily kept in the pattern film of ‘50mm’, according to one embodiment of the claimed invention, than in that of ‘350mm’ of the prior art. *See paragraph [0054] of the specification of the present application.*

In view of the above, Applicant respectfully submits that ‘513 DiMatteo neither teaches nor suggests all of the features of each of Claims 1, 11 and 17. Thus, no *prima facie* of obviousness has been established. Therefore, Applicant respectfully submits that each of independent Claims 1, 11 and 17, as amended is allowable over ‘513 DiMatteo.

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**Patentability of Dependent Claims**

Claims 2-5 and 8 depend from base Claim 1, and further define additional technical features of the present invention. In view of the patentability of their base claim, and in further view of their additional technical features, Applicant respectfully submits that the dependent claims are patentable over the prior art of record.

Particularly, ‘513 DiMatteo neither teaches nor suggests that the operational unit is configured to i) determine borders between each of the plurality of striped patterns included in the photographed image so as to classify the image into pieces, to ii) select image pieces having identical striped patterns from the classified image pieces, and to iii) combine the selected image pieces so as to estimate an image that would be generated by projecting a plurality of single striped patterns onto the object recited in Claim 2. Since in ‘513 DiMatteo, each image is obtained by separately projecting a single pattern onto the object, the ‘513 DiMatteo reference does not determine borders between each of the plurality of striped patterns included in the photographed image (including at least two striped patterns being simultaneously projected). Furthermore, ‘513 DiMatteo neither teaches nor suggests “selects image pieces having identical striped patterns from the classified image pieces” and “combines the selected image pieces so as to estimate an image that would be generated by projecting a plurality of single striped patterns onto the object.”

Claims 9 and 10 were rejected based on ‘513 DiMatteo and ‘011 DiMatteo. Claims 9 and 10 depend from base Claim 1, and further define additional technical features of the present invention. Since ‘011 DiMatteo does not remedy of the deficiency of ‘513 DiMatteo, Applicant respectfully submits that dependent Claims 9 and 10 are patentable over the prior art of record for at least the same reasons. Dependent Claims 6-7 and 12-16 were indicated to be allowable by the Examiner.

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CONCLUSION

In view of Applicant's amendments to the claims and the foregoing remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: \_\_\_\_\_

12/14/04

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